

Tutorial Sheet No. 1

Exercise 01

Convert the following decimal numbers into their binary equivalents:

- a) 45
- b) 128
- c) 7.75

Exercise 02

Convert the following binary numbers into decimal equivalents:

- a) 101101
- b) 1100101
- c) 1001.101
- d) 10011100011011

Exercise 03

Convert the following binary numbers into octal equivalents using two methods:

- a) 1101011
- b) 11101001
- c) 100101

Exercise 04

Convert the following octal numbers into decimal equivalents:

- a) 157
- b) 536
- c) 723

Exercise 05

Convert the following hexadecimal numbers into binary and octal equivalents:

- a) 4A3
- b) B7F
- c) 2D4

Exercise 06

Convert the following decimal numbers into hexadecimal equivalents:

- a) 255
- b) 1647
- c) 9364

Exercise 07

Convert the following decimal floating-point numbers into their binary equivalents:

- a) 23.625
- b) 45.875
- c) 10.3125

Exercise 08

Give the results of the additions in the decimal format using three different ways

- a) $1010 + 1101$
- b) $11101 + 10111$
- c) $1001 + 1101$

Exercise 09

Convert the following binary numbers into their Gray code equivalents:

- a) 1010
- b) 1101
- c) 1000

Exercise 10

Find the binary equivalent of each of the following numbers:

- a) $(4432)_5$
- b) $(56243)_7$

1. Using the indirect method (by first converting to base 10)?
2. Using the direct method (successive divisions)?

Exercise11

- a) Given that $(25)_{10} = (100)_b$, determine the value of b?
- b) Same question for $(545)_{10} = (1406)_b$.

Exercise12

Convert the following binary numbers to base 4, base 8, and base 16:

- a) 1111001010110,11001010
- b) 101010101011,001010111
- c) 11111111,000111

Exercise13

Give the results of the following operations:

- a) $(423)_5 + (434)_5 = ????$
- b) $(506)_7 - (433)_7 = ?????$
- c) $(542)_7 * (64)_7 = ???????$

Exercise14

Encode the three decimal numbers 31, 32, and 33 in BCD code and Gray code. Then verify that only one bit in the encoding changes when transitioning from one to the other in this order.

Exercise15

Convert the decimal number 8.625 to floating-point representation according to the IEEE 754 standard.

Exercice 16

Provide the translation corresponding to the following 4-byte word encoded in hexadecimal: 49 55 50 31, depending on how it is read as:

- a) a signed integer,
- b) an integer represented in two's complement,
- c) a number represented in single-precision floating-point according to the IEEE 754 standard,
- d) a sequence of ASCII characters (each represented on 8 bits, with the most significant bit unused and encoded as 0).